Unsolved Problems of Noise and fluctuations in physics, biology, and high technology (UPoN'02), September 3 – September 6, 2002
NIH campus, Natcher Building (Bldg. 45)

September 3 (DAY 1, Single-session mode, Room E1+E2)

8:30 am	Registration and Coffee
9:00 am	Opening Addresses
9:30 am	**Forces and Fluctuations: Nourished by Noise**, V.A. Parsegian

Constructive Role of Noise I (Sergey Bezrukov, chair)

10:00 am	**Stochastic Resonance in Human and Animal Perception**, F. Moss
10:30 am	Coffee Break
11:00 am	**Can Noise Provide a Functional Benefit to Humans?** J.J. Collins
11:30 am	**Intracellular Fluctuations**, J. Paulsson
12:00 pm	**Subharmonic Stochastic Resonance: a Neural Mechanism for the Missing Fundamental Illusion and the Perception of Pitch**, D.R. Chialvo
12:30 pm	Lunch Break

Materials and Devices I (Derek Abbott, chair)

1:30 pm	**Designing Proteins**, M.F. Shlesinger, A.J. Mandell, K.A. Selz
2:00 pm	**Origins of Non-Gaussian Noise in Metallic Manganites**, M.B. Weissman, A. Palanisami, J.N. Eckstein
2:30 pm	**Thermal (Noise) Death of Moore's Law?**, L.B. Kish
3:00 pm	Coffee Break

Sensory Systems I (Kurt Wiesenfeld, chair)

3:30 pm	**Enhanced Cochlear Implant Coding Using Noise**, R.P. Morse, N.G. Stocks, D.Allingham
4:00 pm	**The Possible Role of Suprathreshold Stochastic Resonance in Neural Coding with Applications to Cochlear Implants**, N.G. Stocks, D. Allingham, R.P. Morse, A.P. Nikitin
4:30 pm	**Noise-Induced Transitions and Synchronization in Sensory Neurons**, A. Neiman, D.F. Russell

Waves, Hydrodynamics, and Mechanics I (Katja Lindenberg, chair)

5:00 pm	**Noisy Wavefront Propagation in the Fisher-Kolmogorov-Petrovsky-Piscounov Equation**, C.R. Doering
5:30 pm	Adjourn

September 4 (DAY 2, Parallel-session mode, Room E1)

8:30 am	Coffee

Sensory Systems II (Nigel Stocks, chair)

9:00 am	**Do Noisy Oscillations in Sensory Receptors Have a Function?**, D.F. Russell, A. Neiman
9:30 am	**Motor Rumblings: Characterization of Adaptation Motors in Saccular Hair Cells by Noise Analysis**, V. Markin, F. Jaramillo
10:00 am	**Noise in Hair Cells**, K.H. Iwasa, M. Ospeck
10:30 am	Coffee Break
11:00 am	**Sensing Nature's Electric fields: Graded Positive Feedback in Ampullae of Lorenzini**, A.J. Kalmijn, S.M. Bezrukov
11:30 am	**Sensing Nature's Electric Fields: Ion Channels as Active Elements of Signal Transduction**, S.M. Bezrukov, A.J. Kalmijn

Constructive Role of Noise II (Michael Shlesinger, chair)

11:50 am	**Noise-Enhanced Signal Transmission: the Benefits of Communicating through Noisy Environments**, J. Garcia-Ojalvo
12:10 pm	**A Dynamical System Exhibits High Signal-to-Noise Ratio Gain by Stochastic Resonance**, Z. Gingl, P. Makra
12:30 pm	Lunch Break
1:30 pm	**The Constructive Role of Noise in Pattern Forming Chemical Systems**, J.M. Sancho, S. Alonso, F. Sagues
2:00 pm	**Noise-induced Hypersensitivity and Stochastic Resonance: Can Living Systems Use Them at a Molecular Level?**, O.V. Gerashchenko, S.L. Ginzburg, M.A. Pustovoit
2:30 pm	**Stochastic Synchronization: a Possible Phase-Transition?**, G. Balazsi, A. Ordemann, F. Moss
3:00 pm	**Open Questions for Suprathreshold Stochastic Resonance in Sensory Neural Models for Motion Detection Using Artificial Insect Vision**, M.D. McDonnell, D. Abbott
3:30 pm	Coffee Break
4:00 pm	**Stochastic Resonance, Brownian Ratchets and the Fokker-Planck Equation**, A. Allison, D. Abbott

Materials and Devices II (Lino Reggiani, chair)

4:30 pm	**Steady State of Random Resistor Networks under Biased Percolation: A Framework for Noise and Conduction in Disordered Materials?** C. Pennetta, E. Alfinito, L. Reggiani
5:00 pm	**Shot Noise as a Tool to Probe Microscopic Interactions**, G. Gomila
5:30 pm	Adjourn

September 4 (DAY 2, Parallel-session mode, Room E2)

8:30 am Coffee

General Theory and Experiment I (Peter McClintock, chair)

9:00 am **First Passage Times for Systems Driven by Long Range Gaussian Noise**, K. Lindenberg, A. H. Romero, J.M. Sancho

9:30 am **Universality of Escape from a Modulated Potential Well**, M.I. Dykman, B. Golding

10:00 am **System Size Resonance in Coupled Noisy Systems and in the Ising Model**, A. Pikovsky, A. Zaikin, M.A. de la Casa

10:30 am Coffee Break

11:00 am **Can Quantum Regression Theorem be Reconciled with Quantum Fluctuation Dissipation Theorem?**, P. Shiktorov, E. Starikov, V. Gruzinskis, L. Reggiani

11:30 am **Metal-Insulator Transition in One-Dimensional Disordered Binary Solids with Long-Range Correlations: Applications to DNA**, P. Carpena, P. Bernaola-Galvan, P.Ch. Ivanov

11:50 am **Direct Observation of Molecular Cooperativity near the Glass Transition**, E.V. Russell, N.E. Israeloff

12:10 pm **Monte Carlo Simulations of Electronic Noise under Large-Signal Operation**, E. Starikov, P. Shiktorov, V. Gruzinskis, S. Perez, T. Gonzalez, L. Reggiani, L. Varani, J.C. Vaissiere

12:30 pm Lunch Break

Waves, Hydrodynamics, and Mechanics II (Lutz Schimansky-Geier, chair)

1:30 pm **Spontaneous Oscillations and Fluctuations at the Cellular Scale**, F. Julicher

2:00 pm **About *Daphnia* Circling in a Light Field and Their Bimodal Distribution of Turning Angle Between Successive Moves**, A. Ordemann, G. Balazsi, F. Moss

2:30 pm **Synthetizing Hydrodynamic Turbulence from Noise: Formalism and Applications to Plankton Dynamics**, F. Sagues, R. Reigada, J.M. Sancho

2:50 pm **Surprising Aspects of Fluctuating "Pulled" Fronts**, D. Panja

Single Molecules I (David Lubensky, chair)

3:10 pm **Highly Accurate Real-Time Classification of Watson-Crick Base-Pairs on Termini of Single DNA Molecules**, S. Winters-Hilt

3:30 pm Coffee Break

4:00 pm **Deducing molecular information from DNA-induced single channel current blockades**, J.J. Kasianowicz, V. Stanford

4:30 pm **Polymer Translocation through a Narrow Pore**, Z. Konkoli, T. Ambjornsson, S.P. Apell, J.J. Kasianowicz, E. Di-Marzio

Ion Channels and Motors I (Dean Astumian, chair)

5:00 pm **A PDE Formulation of Non-Equilibrium Statistical Mechanics for Ionic Permeation**, A. Singer, Z. Schuss

5:20 pm **Hysteresis in Channel Gating,** P. Bennekou, P.Christophersen, H. Flybjerg, E. Gudowska-Nowak

5:40 Adjourn

September 5 (DAY 3, Parallel-session mode, Room E1)

8:30 am Coffee

Central Nervous System (David Russell, chair)

9:00 am **Delays, Scaling and the Acquisition of Motor Skill**, J.L. Cabrera, J. Milton

9:30 am **Development of Demand-Controlled Deep Brain Stimulation Techniques Based on Stochastic Phase Resetting**, P.A. Tass

10:00 am **Noise-Induced Sensitization of Human Brain**, Y. Yamamoto

10:30 am Coffee Break

11:00 am **The Human Brain Uses Noise**, T. Mori, S. Kai

11:30 am **Can Intrinsic Fluctuations Increase Efficiency in Neural Information Processing?** H. Liljenstrom

Neurons and Neuronal Networks (Andre Longtin, chair)

12:00 am **Stochastic Synchronization and Signal Rectification in the Crayfish Caudal Photoreceptor**, S. Bahar, F. Moss

12:30 pm Lunch Break

1:30 pm **Driven by Inhibition**, J.V. Jose

2:00 pm **Correlated Neuron Computation**, J. Feng

2:20 pm **A Novel Mechanism for Irregular Firing of a Neuron in Response to Periodic Stimulation**, J.R. Clay

Genetics and Gene Expression (Ralph Nossal, chair)

2:40 pm **Regulation of Noise in Gene Expression**, M. Thattai, A. van Oudenaarden

3:10 pm **Stochastic Growth of Proteome Complexity due to Evolution**, V.A. Kuznetsov

3:30 pm Coffee Break

Ion Channels and Motors II (Peter Jung, chair)

4:00 pm **Collective Motions in Ion Channels and Lipid Bilayers: a Possible Link to Noise in Single-Channel Measurements?** P. Tieleman

4:20 pm **Ion Channels as Natural Nanodevices**, R.S. Eisenberg

Constructive Role of Noise III (Derek Abbott, chair)

4:50 pm **Is Stochastic Resonance Just an Epiphenomenon?** L.M. Ward.

5:20 pm **Stochastic Resonance with Delay and Traffic**, T. Ohira

5:40 pm Adjourn

September 5 (DAY 3, Parallel-session mode, Room E2)

8:30 am Coffee

Nonlinear Dynamics (Alexander Neiman, chair)

9:00 am **Memory Effects in Stochastic Neurodynamical Systems**, A. Longtin, M. Chacron, B. Lindner, J. Middleton, R. Morse

9:30 am **Fluctuational Escape from Chaotic Attractors**, I.A. Khovanov, D.G. Luchinsky, R. Mannella, P.V.E. McClintock, A.N. Silchenko

10:00 am **Singularities in Far-from-Equilibrium Distributions at Finite Noise Intensities**, A. Bandrivskyy, S. Beri, D.G. Luchinsky, P.V.E. McClintock

10:30 am Coffee Break

11:00 am **Noise and Fluctuations in Excitable Units,** L. Schimansky-Geier

11:30 am **Stability Enhanced by Noise in Nonlinear Systems with Metastable States**, B. Spagnolo, A.A. Dubkov,N.V. Agudov

12:00 pm **Drastic Reduction of the Activation Barrier by a Moderately Weak Periodic Driving**, S.M. Soskin, R. Mannella, A.N. Silchenko, M. Arrayas

12:30 pm Lunch Break

Noise and Noise Analysis in Medical Applications (Frank Moss, chair)

1:30 pm **Statistical Physics Applied to Human Heartbeat Dynamics**, H. E. Stanley et al.

2:00 pm **Cardiovascular Dynamics – Multiple Time Scales, Oscillations and Noise**, A. Stefanovska, A. Bandrivskyy, P.V.E. McClintock

2:30 pm **Some Unsolved Problems in Neural Data Analysis**, M. Ding

3:00 pm **Noise-Induced Surfactant Therapy**, B. Suki, S. Arold, A.M. Alencar, K.R. Lutchen, E.P. Ingenito

3:30 pm Coffee Break

4:00 pm **Noise and Fluctuations in Biological and Physical Discrete Stochastic Systems with Long-Range Correlations**, R. Yulmetyev, P. Hanggi, F. Gafarov

Materials and Devices III (Laszlo Kish, chair)

4:20 pm **To Be or Not to Be a Source of Shot Noise: an Open Problem of Generation-Recombination Noise**, G. Gomila, L. Reggiani

4:50 pm **Instability of the Noise Level in Polymer FETs with Non-Stationary Mobility**, O. Marinov, M.J. Deen, J. Yu, G. Vamvounis, S. Holdcroft, W. Woods

5:10 pm **Monte Carlo Simulation of Noise in Electronic Devices: Limitations and Perspectives**, T. Gonzalez, J. Mateos, M.J. Martin-Martinez, S. Perez, R. Rengel, B.G. Vasallo, D. Pardo

5:40 pm **Excess Noise in the Output of Linear Fluctuating Systems**, M.H.W. Hoffmann

6:00 pm Adjourn

September 6 (DAY 4, Single-session mode, Room E1+E2)

8:30 am Coffee

Ion Channels and Motors III (Robert Eisenberg, chair)

9:00 am **Turning a Poor Ion Channel into a Good Pump**, R.D. Astumian

9:30 am **Carbon Nanotubes as Molecular Channels**, G. Hummer

10:00 am **Origins of $1/f^{\alpha}$ Noise in Membrane Channel Currents**, Z. Siwy, A. Fulinski

10:30 am Coffee Break

11:00 am **Receptor and Ion Channel Clustering**, P. Jung, J.W. Shuai

11:30 am **The Noisy Steps of a Motor Protein**, M. Bier

Sensory Systems III (Mark Spano, chair)

12:00 pm **Mathematical Modeling of Visual Transduction; Homogenization and Concentrated Capacity**, E. DiBenedetto

12:30 pm Lunch Break

Single Molecules II (Sergey Bezrukov, chair)

1:30 pm **Single Molecule Enzymatic and Conformational Dynamics**, S. Xie

2:00 pm **Entropic Barrier Theory and Modelling of DNA Translocation through Protein Channels**, M. Muthukumar, C.Y. Kong

2:30 pm **Statistical Analysis of Single Molecule Experiments**, Samuel Kou

3:00 pm Coffee Break

3:30 pm **Unzipping DNA: From Pores to Pulling and Back Again**, D. Lubensky

General Theory and Experiment II (Alexander Berezhkovskii, chair)

4:00 pm **Adiabatic Elimination and Rate Description**, P. Talkner

4:30 pm **Walking Without a Pattern Generator**, J.L. Mateos, A. Neiman, F. Moss

5:00 pm **On the Amplitude and Time-Structure Properties of $1/f^{\alpha}$ Noises**, Z. Gingl, R. Mingesz, P. Makra

5:30 pm Adjourn